Integrating Custom-built Software User Interfaces with Hardware Platforms for Real-time Data Visualization and Analysis in Industrial and Biomedical Engineering Applications

Keynote Address

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Abstract

Software user Interface development is involved in a wide range of projects from personal computer devices, to industrial systems, and to medical instrumentation. The use of the user interface in these systems is to provide effective humanmachine interaction that allows effective operation and control of the hardware platforms (machines) from the human end, whilst the platforms simultaneously feeds back data/information that reports their operational and measurement status, control stability, and system reliability as well aids the operators’ decision making process. To communicate system data/information clearly and efficiently to users, real-time data visualization and analysis function of user interfaces plays an important role in making complex data/information more accessible, understandable and usable. It is a major feature of high-performance software user interface for user friendly hardware platforms developed in different application domains. In this talk, based on my previous research experience in the topic, several successful applications including projects from industrial companies ABB, Ford, and PPG and projects in biomedical engineering will be presented and discussed. These projects incorporating hardware platforms with custom-built software user interfaces for real-time data visualization and analysis demonstrate the advancement of the engineering system development with the goal of discovering useful information, suggesting conclusions, and supporting decision-making for users.

Bibliography

Dr. Yantao Shen received his Ph. D. degree from the Chinese University of Hong Kong and is currently an Associate Professor in the Department of Electrical and Biomedical Engineering at University of Nevada, Reno (UNR). His current research interests include Bioinstrumentation and Automation, Biomechatronics/-robotics, Sensors and Actuators, and Tactile & Haptic Interfaces. Dr. Shen has authored-coauthored one book chapter and over 100 peer-reviewed journal and conference papers, and co-holds four US patents. He was also a finalist of Best Vision Paper Award in the 2001 IEEE ICRA, a finalist of Best Conference Paper Award in the 2007 IEEE RO-MAN, a winner of the T. J. Tarn Best Paper Award
in the 2009 IEEE ROBIO, and a finalist of Best Conference Paper Award in the 2014 IEEE ROBIO. Dr. Shens research is currently funded by NSF, NASA and National Robotics Initiative (NRI) (Through NIH R01), as well as the state and local agencies. He was a recipient of NSF CAREER Award, the 2015 Excellence Award in research from UNR College of Engineering and the UNR IEEE Outstanding Electrical Engineering Professor in both 2010 and 2011.